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## THE ESTABLISHMENT OF STANDARD GRADES FOR AMERICAN COTTON LINTERS

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As a matter of public interest and in order to furnish a more complete description of the standards, a brief review is here given of American cotton linters and of the movement leading to the establishment of standard grades for the commodity under the authority of the cotton standards act.

### COTTON LINTERS DEFINED

Cotton has been defined as "the vegetable hair removed from cottonseed in the usual processes of ginning," and cotton linters as "the vegetable hair removed from cottonseed in processes subsequent to the usual processes of ginning." This hair or residual fiber called linters is usually recovered by intensive ginning or delinting as a step in the preparation of cottonseed for crushing.

### NEED FOR STANDARDS

During the season 1913-14, immediately preceding the outbreak of the World War, 4,847,628 tons of cottonseed were crushed, from which 660,087 bales of linters of 500 pounds net were recovered. These were valued at \$7,630,000.<sup>1</sup>

Linters is an excellent source of munitions cellulose and its production is localized at a comparatively few points—the cottonseed oil mills. The source of linters being so easily accessible, as soon as the United States entered the World War, rules were immediately issued

<sup>1</sup> U. S. BUREAU OF THE CENSUS. COTTON PRODUCTION AND DISTRIBUTION, SEASON OF 1925-26. U. S. Bu. Census Bul. 160, 65 p., illus. 1926.

governing their cutting or recovery, and the entire crop was requisitioned for war uses. The crop of 1916-17 amounted to 1,273,345 bales valued at \$45,193,000, and that of 1917-18 to 1,080,802 bales valued at \$26,604,000. To meet war requirements and in the absence of standards as a guide, the intensity of the delinting processes was increased without knowledge of the probable results. At the sudden termination of hostilities, the War Department found that it had on hand a great confusion of qualities of linters, in enormous quantities and with little peace-time value. The War Industries Board immediately requested that a study of the situation be made with a view to the establishment of standard grades. Studies were promptly undertaken by the Department of Agriculture, and four tentative grades were proposed. In the meantime, however, the supply on hand had been disposed of by the War Department, and the crop and its value had dropped to 422,226 bales worth only \$3,506,000. Interest in the subject for the time being was lost.

### INDUSTRY REQUESTS STANDARDS

With the crop of 1923-24, however, production of linters had increased to 642,384 bales worth over \$22,000,000 and the industry itself revived the question, which took the form of a resolution by the Interstate Cotton Seed Crushers' Association in annual convention in New Orleans, May, 1924. In this resolution the Secretary of Agriculture was requested to renew the study of the commodity with a view to the establishment of standard grades. These studies were begun in July, 1924, and were followed along three lines: (1) The requirements and preferences of the consumers of linters; (2) the methods of grading and marketing linters used by dealers, brokers, and agents; and (3) the methods of delinting or recovering linters and the possibilities of controlling the quality of linters by mechanical adjustments of the delinting apparatus. These studies were immeasurably facilitated by the hearty cooperation that was given by all branches of the industry, producers, middlemen, and consumers. To assist the department in the work, the Interstate Cotton Seed Crushers' Association appointed the following committee on the standardization of linters: A. K. Burrow of Memphis, Tenn., chairman, T. J. Kidd of Birmingham, Ala., Edgar L. Pearson of Houston, Tex., S. W. Wilbor of Paris, Tex., P. H. Lamar of Atlanta, Ga., and J. H. Turberville of Jackson, Miss.

This committee was supplemented by A. A. Taylor of Lockland, Ohio, representing the Better Bedding Alliance of America and D. G. Robson of Memphis, Tenn., representing the American Cotton Linters Association.

### DEFINITIONS OF TERMS

Two conclusions were reached from these studies: (1) That linters is a commixture of two types of fibers—the long, usually soft or flaccid fibers that may have escaped removal during ginning, and the very short, more deeply colored fibers or fuzz that are found more or less densely matted about the seed coat at the base of the long fibers of American upland varieties of cotton; (2) that there are four factors influencing the grade or value of linters—staple, foreign matter, color, and character.



### STAPLE

In describing linters the word staple is used with reference to the different blends or the preponderance of one or the other of the two types of fiber of which linters is composed. While the degree of intensity of the delinting process and the variations in the total residual fiber in different lots of seed make possible all degrees in the mixtures or blends of these two types of fiber, each special channel of consumption is very definitely limited to comparatively narrow variations in the blends.

### FOREIGN MATTER

The quantity of foreign matter in linters is very largely controlled by the care exercised in cleaning the seed before delinting. Foreign matter consists chiefly of broken leaves, motes, sticks, dirt or dust, and particles of the seed coat or hull that have been rasped off by the delinting saws. The nature of the foreign matter varies in the different geographic sections in which linters are produced. In southeastern linters the foreign matter is likely to consist chiefly of very fine particles of the seed coat, known as pepper trash. The particles of seed coat or hull in valley linters are usually larger than in southeastern linters. Western linters are usually rather free of pepper trash, but frequently contain more large pieces of hull, broken leaves, etc., than are found in linters from other sections.

### COLOR

The normal or natural colors of linters are olive and buff, with different shades of the two. During exposure to light the olive coloring sometimes shades off through a deep buff to a light buff. In trade parlance these colors are usually spoken of as green, reddish, and cream. Olive prevails in southeastern and valley linters and buff to light buff in western and southwestern linters. Natural colors are easily bleached. Other colors also are sometimes found in linters. They are usually the result of weather damage or fungous staining of the fiber, either while yet on the undelinted seed or after delinting and baling, through exposure of the bale. Such colors might be called unnatural colors and are difficult or impossible to bleach.

### CHARACTER

Character is a term used to cover a combination of three elements—maximum length and uniformity in length of the long fibers, softness or harshness (resiliency) of the mass of fibers as a whole, and smoothness or neppiness. Character in linters is apparently sectional, and is probably influenced by soil and seasonal conditions and by the prevailing varieties of cotton planted. Western or Texas-Oklahoma linters are harsh, resilient, usually neppy, and the long fibers are comparatively short and regular in length. Mississippi Valley linters, usually called valley linters, are soft. The long fibers are the longest found in linters, but usually are irregular in length. Valley linters are frequently neppy, but not as distinctly so as western linters. Southeastern linters compare with valley linters in softness, but are smoother and less neppy. The long fibers are intermediate in length between western and valley linters, and are uniform in length. In general both valley and western linters appear to be a homogeneous mixture or blending of the long

fibers and fuzz. Southeastern linters are distinctly different in this respect from linters produced in the other two regions, having a filamentous appearance as if made up of fine laminations of the long fibers and the fuzz. In the trade the three characters of linters are described simply as "southeastern," "valley," and "western."

While the color of linters and the character are both usually associated with certain sections which might be roughly described as southeastern, valley, and western, at times linters of the character and color usually associated with one section may be produced in another section.

#### CUTTING

Reginning, or delinting, is more generally spoken of as "cutting."

#### FIRST CUTS

Cuts ranging from 20 to 50 pounds per ton of seed have generally become known as "first cuts" or "first-cut linters."

#### MILL RUNS

Cuts ranging from about 35 to 100 pounds or more per ton of seed are known as "mill runs" or "mill-run linters."

#### SECOND CUTS

After a first cutting, especially if not over 35 pounds per ton of seed have been removed in the first delinting, the seed are frequently passed through the linter machine a second time. The linters thus recovered are known as "second cuts." The total amount of linters cut ranges from about 30 pounds to as high as 200 pounds per ton of seed.

#### HULL FIBER

It has not been found generally economical to attempt a complete denuding of the seed preparatory to crushing. A heavy cut mill run or a second cut is usually sufficient for practical purposes. This leaves a portion of the fuzz still attached to the seed coats or hulls when the seed are decorticated and the kernels and hulls separated. The demand for cellulose has been so acute in recent years that a number of mills have installed special apparatus for recovering the fiber from the hulls, after decortication. Linters of this type of fiber have become known generally as "hull fiber."

#### GRADES PROPOSED

With this information the department constructed seven tentative grades. These grades were based chiefly on the different blends of the two types of fibers and combined in each grade samples of such different blends as are usually baled together in well-managed mills, are within the possibilities of control by mechanical adjustments of the delinting apparatus, and meet the special requirements of consumption. Each grade was made up of 12 samples in the normal colors of linters. The three sectional characters were represented by the same four samples in each box, and foreign matter was shown of the usual sectional nature and in an amount not easily removed and usually to be found in linters carefully cut and baled.

In this manner each box of 12 samples representing a single grade of linters was made to embody, as nearly as possible, the ideals of the consumers and the possibilities of the producers. One grade, for



instance, illustrates linters desirable for absorbent cotton, surgical dressings, spinning, high-grade battings, etc. Another illustrates linters suitable for certain nitrating purposes, and another, the most desired form of linters for munitions. Each meets the requirements for particular types of mattress feltings.

These seven boxes of samples representing a new plan for the grading of linters were presented by the department to a special meeting of the linters standardization committee held in Memphis, Tenn., on January 9, 1925. All members of the committee were present at this meeting, together with the representatives of the Better Bedding Alliance and the American Cotton Linters Association. After a thorough discussion, the plan presented for the grading of linters was approved and later, after the positions of two or three samples had been interchanged, the boxes as a whole were also unanimously approved as grades.

On January 13, 14, and 15, 1925, the proposed grades were exhibited and discussed at the annual convention of the Better Bedding Alliance of America held in Chicago, Ill. This convention passed a resolution approving the boxes as standard grades.

Following this the boxes were presented to the convention of the Interstate Cotton Seed Crushers' Association held in New Orleans May 13, 14, and 15, 1925. After a thorough discussion this convention approved the grades and recommended their adoption as official standards.

### GRADES PROMULGATED

With its work so fully indorsed, the department proceeded with the legal phases of establishing the proposed grades as part of the official standards of the United States. This was accomplished by an order of the Secretary dated July 7, 1925, establishing them immediately as tentative standards and giving public notice that on August 1, 1926, they would become the official standard grades of the United States for American cotton linters.

Since that form of linters known as hull fiber is composed almost exclusively of the fuzz type of fiber, most of which is itself broken or cut, it is not possible to put up permanent samples of it in the form of physical types. Therefore, the order of the Secretary simply describes such linters in the following terms: "American cotton linters, the fiber of which is below that shown in grade 7 herein established, shall be designated as 'hull fiber.'"

### USING THE STANDARDS

The construction of the boxes containing the samples of physical types representing the standard grades is simple and yet so comprehensive as to permit of a very wide range of subdivision for trading purposes. In each box or grade the samples are placed in three rows of four samples each. Samples 1, 2, 3, and 4 in the top tier of each box represent the character and foreign matter of southeastern linters. Samples 5, 6, 7, and 8, the middle tier, represent valley linters. The bottom tier, samples 9, 10, 11, and 12, represent western linters. Samples 1, 5, and 9 of each box represent the blends, for each character, having the greatest proportion of long fibers included in each grade; and samples 4, 8, and 12 represent the blends having the smallest portions of long fibers in each grade. In adjacent grades, samples 4, 8, and 12 of the higher grade are the equal, respectively,

of samples 1, 5, and 9 of the next lower grade. Therefore, in each character there are 28 samples in all, 6 of which are duplicates, leaving 22 samples to represent the entire range of blends of fiber from that having the highest proportion of long fiber to that having the largest proportion of fuzz. These 22 samples are divided into seven sections which are designated as grades.

### SUBDIVISIONS OF GRADES

This arrangement of samples and characters enables the grades to be subdivided for trading purposes (1) directly into the three characters, and (2) whenever expedient, by reference to the number of the sample and grade down to individual samples or combinations of samples.

The three characters for each grade were assembled into a single box primarily for the convenience of traders, but this grouping should be advantageous to producers because of the occasional seasonal occurrence of a particular character outside of its normal region. It should be of value also to consumers so that all may be advised fully as to all qualities of linters available.

### BOARD OF COTTON LINTERS EXAMINERS

On December 11, 1926, the regulations of the Secretary of Agriculture under the cotton standards act were amended so as to provide the same Government facilities and service for cotton linters as were available for cotton. Under this amendment a board of cotton linters examiners was established in Washington, D. C., consisting of three members (G. S. Meloy, chairman, F. S. Hubbard, vice chairman, and V. R. Fuchs), with power to certificate the grade and character of such samples and bales of linters as might be submitted for the purpose.

Provision was made also for the licensing of competent persons to grade and classify linters and to certificate the grade or the class in accordance with the official standards of the United States for American cotton linters.

On March 25, 1927, a meeting was held in Memphis, Tenn., at the call of the linters standardization committee of the Interstate Cotton Seed Crushers' Association, to which were invited representatives of the Mattress Manufacturers Association, the chemical users of linters, linters dealers' associations and exchanges, and cottonseed crushers. The purpose of the meeting was to discuss the sufficiency and the increased utilization of the standard grades.

During the conference it was brought out that both the construction of the grades and the method of preparation of the samples were entirely new to the industry. The department was requested to furnish holders of copies of the standard grades with small loose samples illustrating the characters and staples as represented in the standard grades so that they might better acquaint themselves with the standards. This the department agreed to do with the understanding that the samples so furnished would be used for informative purposes only, without official status and would not be used or substituted for the standards.

The conference also recommended that the linters standardization committee of the Interstate Cotton Seed Crushers' Association draft trading rules on which transactions involving linters might be based.



## INDUSTRIAL TRADING RULES

At the annual convention of the Interstate Cotton Seed Crushers' Association held in Memphis, Tenn., May 25, 26, and 27, 1927, the linters standardization committee brought in its report, which included a complete set of trading rules recognizing and based upon the use of the standard grades. These trading rules are the first of their kind covering transactions in linters, which warrants their incorporation in this report. The rules as adopted by the convention<sup>2</sup> are as follows:

*American cotton linters.*—Contracts for the purchase and sale of American cotton linters, unless otherwise specified, shall be subject to the following terms:

(1) In all contracts for specific grades of cotton linters the grades of the official standards of the United States for American cotton linters shall be used or implied, unless purchases are made on actual samples or types.

(2) Sales calling for even running grades may contain bales of grades other than that specified, as follows:

(a) Sales of U. S. grade No. 1 may contain not to exceed 5 per cent of bales fully equal to U. S. grade No. 2.

(b) Sales of U. S. grade No. 2 may contain not to exceed 10 per cent of bales fully equal to U. S. grade No. 3, if offset by 10 per cent of bales better than U. S. grade No. 2, but not necessarily fully equal to U. S. grade No. 1.

(c) Sales of U. S. grade No. 3 may contain not to exceed 10 per cent of bales fully equal to U. S. grade No. 4, if offset by 10 per cent of bales better than U. S. grade No. 3.

(d) Sales of U. S. grade No. 4 may contain not to exceed 10 per cent of bales fully equal to U. S. grade No. 5, if offset by 10 per cent of bales better than U. S. grade No. 4.

(e) Sales of U. S. grade No. 5 may contain not to exceed 5 per cent of bales fully equal to U. S. grade No. 6, if offset by 5 per cent of bales better than U. S. grade No. 5.

(f) Sales of U. S. grade No. 6 may contain not to exceed 5 per cent of bales equal to U. S. grade No. 7, if offset by 5 per cent of bales equal to U. S. grade No. 5.

\* (g) Sales of U. S. grade No. 7 may contain not to exceed 10 per cent of bales equal to U. S. grade No. 6.

(3) Sales of linters of combination grades may contain even running bales or bales containing a combination of two or more grades. In such sales, the seller shall estimate and state the percentage of each grade in the lot; and delivery shall be good, provided not less than 90 per cent of the estimate for each grade be tendered.

(4) Unless otherwise specified linters shall be of natural colors only.

(5) Sectional character shall be specified, otherwise grading shall be done without reference to this character.

*Excess of low grades.*—Any excess of low grade may be rejected by the purchaser, or claimed for at an allowance. If rejected and rejection sustained, the seller is to have the right to replace, and the purchaser may require replacement. The cost and actual expense of handling rejections shall be paid by the loser.

*Sales on actual samples.*—Whenever a specific lot of cotton linters purchased on actual samples does not equal the samples, the purchaser shall have the right to reject the lot if less than one-half is equal to the samples. If one-half or more is equal to the samples, the purchaser may reject the portion not equal to the samples; but in either event, samples of the entire lot must be exhibited to the seller. The cost and actual expense of handling rejections shall be paid by the seller, and in case of rejection the seller shall not be called upon to replace.

*Time limits for replacements.*—Whenever, under these rules following agreed or sustained rejection, replacement is made, seller shall have the following time limit to effect such replacement. It is understood that this computation is to begin with the actual date of notice or demand by buyer or seller (as the case

<sup>2</sup> The Interstate Cotton Seed Crushers' Association includes in its membership cottonseed crushers, cottonseed-oil refiners, producers of linters, dealers in linters, and consumers of linters.

may be) that replacement is desired and it is further understood in computing time that delivery f. o. b. a shipping point is implied.

(a) Where contract provides for "immediate" shipment, replacement is to be made within three days.

(b) In all other cases, replacement is to be made within 10 days.

*Linters made from threshed, burned, or damaged seed.*—Linters made from threshed, burned, or damaged seed, and which are consequently affected in quality, or linters carrying an objectionable odor, shall not be a good delivery on contract, and may be rejected by buyer, and replacement may be demanded.

*Linters containing excess trash, etc.*—Linters containing excess trash, whole seed, sweepings, or hull fiber may be rejected by buyer, who may demand same replaced.

*Cottonseed hull fiber.*—Cottonseed hull fiber shall be that form of linters defined by the Secretary of Agriculture in section 8, Service and Regulatory Announcements No. 94.

*Standard weight and dimensions.*—The standard bale of American cotton linters, for contract purposes, shall average 600 pounds, including tare, and bales weighing less than 450 pounds shall not be tenderable on contract.

The tare shall not exceed 5 per cent.

*Weather damage.*—Linters must be suitably baled and tied and free from weather damage.

*Classification.*—In arbitration of linters either party shall have the right to demand official classification by the United States Department of Agriculture, which shall be final, but nothing in this rule shall prevent the mutual agreement to arbitrate under the terms of rule 290.

*Sampling (for arbitration), time, place, and method.*—When at American destination samples must be drawn by disinterested party, within 10 days after arrival and delivery. When at point of origin, samples can be drawn by buyer's and seller's representatives, if mutually agreeable, or by disinterested party. Samples must be drawn within five days after date of disagreement.

Samples must be taken from three places from each head of the bale (six pieces) and regardless of size or condition of each piece of sample, it must be understood to represent approximately one-sixth of the bale. The sample representing each bale shall weigh approximately 8 ounces.

Samples must be securely sacked, sealed, and sent to arbitration board within 48 hours after being drawn.

*Passage of title.*—Where contracts of sale, covering cotton linters, cottonseed notes, grabbats, etc., specify "f. o. b. cars," the material covered thereby will not become the property of buyer until actually loaded into cars at point of origin and covered by railroad bill of lading. (See exception.) If such material is destroyed before contract terms are completed, seller may replace and buyer may demand replacement, the time limit and penalties in connection with such replacement to be as provided in rule 132.

(Exception. It is understood that where, by special agreement, partial or complete payment for material has been made by buyer, prior to loading into cars, title to such material passes to buyer with and at the time of such payment. Such material will be at buyer's risk of insurance and in case of destruction no replacement can be demanded other than under the common law.)

## PREPARATION AND DISTRIBUTION OF COPIES

Copies of the standard grades for American cotton linters are prepared by the department and sold to the trade in the same manner as are copies of the cotton standards. The price has been fixed at \$5 a grade. Because of the vicissitudes of use and the probability of alterations, the life of the copies as official copies has been limited to one year from the date of issue.

To facilitate export business in American cotton linters the department has placed copies of the standards, so that they might be available for reference, as follows: With the Liverpool Cotton Association, Ltd., Liverpool, England; the Syndicat du Commerce des Cotons au Havre, Havre, France; the Bremer Baumwollbörse, Bremen, Germany; and at the American Embassy, London, England.





